

ECE 3600 Final Exam Study Guide

The Review will be on Tuesday 12/14/10

The Final Exam will be on Thursday 12/16/10

BOTH at 1:00 pm in WEB 2250

The first part will be a **closed book, no calculator** questions, ~ 50 - 60 points. 5 or 6 problems, 100 - 110 points

The second part will be a **open book, open notes, with calculator** problems.

The exam will cover

1. Material from Exam 1 and Exam 2

2. HW 1 AC steady-state review, used extensively throughout class

3. HW 2 RMS & Single-phase AC power. P Q S $|S|$ pf correction of pf

4. HW 4 Energy sources, plant efficiencies

5. HW 5 3-phase AC power.

$$\begin{array}{ccccccc} V_L & V_{LL} & V_{LN} & I_L & I_{LL} & I_Y & S_{3\phi} & S_{1\phi} \\ Z_Y = \frac{Z_{\Delta}}{3} & & & Z_{\Delta} = 3 \cdot Z_y & & & \text{pf} & \text{correction of pf} \end{array}$$

6. HW 7 Magnetic circuits

$$B = \mu \cdot H \quad H = \frac{N \cdot i}{l_m}$$

7. HW 7 - 9 Transformers

Calculations

Impedance transformation

OC & SC Tests --> model

η & VR

Autotransformers

3 ϕ Transformers Δ & 3rd harmonic

8. HW 9 - 11 One-Line Diagrams, variations pu system

Per-phase and pu analysis

Calculations

Base Values S_{base} V_{base} I_{base} Z_{base}

Base transformation

9. HW SG1 & SG2 Synchronous generators and motors

Know the phasor diagram!

(closed book)

Possible questions

Study the questions
from exam 1 and 2

Basic relationships and units

Lots possible

Basic magnitude and
phase relationships

Flux density, Field intensity,
Permeability, B-H curve. effects
of nonlinearity on some currents
(3rd harmonic).

losses, ideal/non
construction, ratings,
magnetization reactance,
core losses, winding losses,
leakage reactance.

Autotransformers

Why? basics

common symbols

losses, construction,
limits, operation

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10. HW 15 - 17 Induction motors

Know the model!

Powers P_{AG} P_{conv} P_{out} etc. η

Torque & speeds

Types & effect of R_2

Single phase motors

Poles, slip, why, how

Question 7-11 HW17, p3

Typ torque-speed curves

Single phase starting

11. HW 18 - 19 DC motors

Know the model!

Powers P_{conv} P_{out} etc. η

Torque & speeds

Series-wound & universal motors

Torque-speed curve

Torque-speed curve

12. HW 20 Transmission Lines

Short, Med, Long Z_C SIL

Series impedance Z_{series} Shunt admittance & $\frac{Y_{shunt}}{2}$
Shunt impedance & $2 \cdot Z_{shunt}$

Models and calculations

Short, Med, Long mi, km

Surge impedance

Surge impedance loading